

REMARKS AND ARGUMENTS

A. Claim Status

Claims 22-52 are pending in the application.

Claims 22-52 were rejected under 35 U.S.C. § 103 (a)

B. Amendments

Claim 28 has been amended to correct a typographical error.

C. Correction of Office Action

In a telephone conversation between the undersigned and the Examiner on May 20, 2004, the Examiner acknowledged that the first sentence on page 3 of the Office Action should read, in part: " . . . as recited in claims 22, 40, 43, 46, and 49."

D. Remarks

Claim 28 has been objected to on account of the word "carder." Following the Examiner's requirement, this claim has been amended in order to correct this typographical error. The word "carder" has been replaced by the correct word, "carrier."

Claims 22-52 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,378,499 to Spangler in view of Kublak, U.S. Patent No. 5,577,092. Applicants respectfully traverse.

The MPEP, Section 2143, contains the following:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference

or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.

Applicants respectfully submit that the inventions of the cited references are based on physical principles distinct from those of the present claims, and the references provide no motivation to one of ordinary skill to modify or combine them to produce the present claims. In particular, there is no motivation to combine because the conditions inside the spectrometer invention of Spangler are not compatible with the intended purpose of the invention of Kublak.

US Pat. 5,577,092: Kublak discloses an ultra-low debris plasma source for producing extreme ultra violet and soft x-ray radiation. It is based on the interaction of intense laser light with molecular clusters that have been formed by a gas expansion through a supersonic nozzle. The invention itself – a novel radiation source – is not related to applicants' patent application. The Examiner cites this patent to show that cluster formation by supersonic gas expansion is a well-established technique. Applicants agree with the Examiner in this point and emphasize that applicants' patent application explicitly states this: (page 3, par. 3) *"The production of atom or molecule structures in the form of clusters is generally known"*.

US Pat 4,378,499: Spangler discloses an ion mobility detector in which the ionization behavior of the sample gas or vapor is modified by surface interaction. While applicants present a novel ionization mechanism that ionizes neutral matter Spangler employs standard ionization techniques to create its primary ions. This is evident from its general description of an ion mobility spectrometer (col 1, lines 20-25, "... a typical ion mobility spectrometer is comprised of a combined ion source and). In fact, Spangler is suggesting to use well-known radioactive ionization to form the primary ions as is evident from the radioactive ionization source (Ref. Nr. 21) that is present in all embodiments of the invention given in Fig. 1 - 5.

While Spangler's invention is not concerning a novel ionization method, it is addressing a common problem in ion mobility spectrometry: Primary ionization yields predominantly carrier gas ions (col 1, lines 31-35). Sample molecules are ionized by subsequent charge transfer reactions upon collisions with ionized carrier gas particles. In this context, Spangler uses the

term "charge transfer reaction" to describe the transfer of charge from an already charged entity to an originally neutral entity (col 1, lines 39-43; col 2, lines 21-23). In this case, the number of charged particles remains constant, equal to one. On the other hand, in applicants' patent application the term *charge transfer reaction* predominantly describes the transfer of charge from a neutral entity to another neutral entity, forming two oppositely charged charge carriers (applicants' Claim 22). The number of charges goes from zero to two.

Charge transfer reactions of the Spangler type are governed by the electron affinity and/or the proton affinity of the reaction partners involved (col 2, lines 26-31). Spangler proposes chemical modification of the sample molecules to obtain a proton / electron affinity that is optimal for their detection by using chemical surface reaction (col 2, lines 31-45). Also by chemical surface reactions he wants to modify extraneous molecules in such a way that their new electron / proton affinity avoids their detection (col 2, line 46 - col3, line 10). It is important to note that the chemical reactions employed by Spangler to modify his molecules do not lead to ionized products themselves. This is evident e.g. from col 5 lines 51-53: "After completion of the surface reaction, the modified molecules escape the surface and are carried into the ion mobility detector for ionization". On the other hand, whenever chemical reactions are referred to in applicants' patent application it is in the sense of chemical charge transfer reactions that form charged product ions out of neutral educt molecules. E.g., applicants employ acidic or basic reaction partners to induce proton transfer reactions that lead to charged products. Spangler on the other hand, uses acidic surface coatings (col 4 line 56) to chemically modify the impinging sample molecules (oxidation) without ionizing them.

At no point does Spangler consider neutral molecular clusters as a central part of his method. The mentioning of alkane clusters and alkane cluster ions is described as an obstacle to ion mobility performance, not as a necessary ingredient. In fact, experimental conditions inside an ion mobility spectrometer, namely atmospheric pressure and small mean free path (col 1, lines 11-20) are incompatible with formation of molecular clusters by adiabatic expansion which requires high vacuum conditions. Hence, the setup of Spangler cannot be modified to employ a supersonic nozzle as disclosed e.g. by Kublak.

4. Summary

Applicants' patent application discloses a novel ionization mechanism that allows converting neutral particles into ionized particles. On the other hand, Spangler discloses methods to tailor

the identity of existing ions to experimental needs. The two methods are different and have no common objective. It is not true that by simply adding a supersonic nozzle to the setup of Spangler applicants' ionization method can be obtained, since the physical conditions inside the ion mobility spectrometer are incompatible with cluster formation by adiabatic expansion.

Applicants therefore respectfully submit that the present claims are not obvious. The references cited by the Examiner are based on physical phenomena distinct from those of the present claims. The Kublak invention cannot be combined with the Spangler invention without the Kublak invention being rendered unsatisfactory for its intended purpose. There is no motivation in the cited references to combine them to produce the invention defined by the present claims.

E. Conclusions

Applicants believe that the foregoing amendment and remarks have overcome or rendered moot all grounds for rejection and objection, and that the application is in a condition for allowance. Applicants therefore respectfully request prompt action on the claims and allowance of the application. If the Examiner believes that personal communication will expedite prosecution of the application, the Examiner is invited to telephone applicants' undersigned agent directly.

AUTHORIZATION AND PETITIONS

Applicants believe that no extension of time is required to make submission of the response timely. However, in the event that an extension of time is required, Applicants hereby submit a petition for such extension of time as may be necessary to make this response timely. The Commissioner is hereby authorized to charge any necessary additional fees for extension of time or additional claims to deposit account No. 502194. A duplicate of this Authorization is enclosed.

Respectfully Submitted,

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